

In re application: Jun Zheng
Filed: 08/16/2001
Response Dated 12/10/2003

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Serial No.: 09/931,669
Attorney's Docket: PAT036US
Reply to final Office action of 07/30/2003

LISTING OF CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended) A laser structure, comprising:
 - a substrate;
 - a bottom mirror disposed on the substrate;
 - an active region layer means for generating light in response to optical pumping, the active region layer means comprising active region material and having a bottom and a top surface;
 - an optical pumping means for pumping light into an active region section of the active region layer means to cause the active region section to generate light therein and to emit said light out of its top surface, comprising an wherein the active region section is adjacent and active region layer portions of the active region layer means outside the active region section, the active region layer portions outside the active region having a top surface, the active region having a bottom and a top surface, wherein the active region layer means is adapted to be optically pumped and is disposed at its bottom surface on the bottom mirror and the active region is for emitting light generated therein out of its top surface; and
 - a heat-spreading layer disposed directly on the top surface of the active region on the active region section and the portions of the active region layer and on the top surface of the active region layer portions outside the active region, the heat-spreading layer comprised of a material having a thermal conductivity greater than that of the active region layer means whereby some of the heat generated in the active region section during optical pumping thereof by said optical pumping means is conducted from the top surface of the active region section into the active region layer portions of the active region layer outside the active region via the heat-spreading layer;
 - a top mirror disposed above the heat-spreading layer such that the active region section is interposed between the top mirror and the bottom mirror.

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2. (previously canceled)
3. (previously amended) The laser structure of claim 1, wherein the heat-spreading layer has a thickness between about 1 μm and 4 μm .
4. (previously amended) The laser structure of claim 3, wherein the heat-spreading layer consists of InP.
5. (previously canceled)
6. (currently amended) The laser structure of claim 1, further comprising a second heat-spreading layer disposed directly on the bottom surface of the active region, between the active region section and the bottom mirror.
7. (canceled)
8. (previously canceled)
9. (canceled)
10. (currently amended) The laser structure of claim ~~7~~ 1, wherein the heat-spreading layer ~~has a thickness between about 1 μm and 4 μm~~ has a thermal conductivity of about 0.68 W/cm/K.
11. (canceled)
12. (previously canceled)
13. (previously amended) The laser structure of claim 8, wherein the top mirror comprises a top distributed Bragg reflector (DBR) and the bottom mirror comprises a bottom DBR.

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14. (previously amended) The laser structure of claim 13, wherein:
the top and bottom DBRs are for at least partially reflecting light at a wavelength and the active region section is for generating light at the wavelength; and
the heat-spreading layer is substantially transparent to light at the wavelength.

15. (previously amended) The laser structure of claim 13, wherein the top DBR comprises a dielectric top DBR and the bottom DBR comprises a semiconductor bottom DBR, wherein the heat-spreading layer has a thermal conductivity greater than that of the top DBR and greater than that of the bottom DBR.

16. (previously canceled)

17. (currently amended) The laser structure of claim 1, wherein the top mirror is mounted above the heat-spreading layer with a gap between the top mirror and the heat-spreading layer, wherein the laser structure comprises a vertical external-cavity surface-emitting laser.

18. (previously canceled)

19. (previously canceled)

20. (currently amended) The laser structure of claim 1, wherein the active region layer means comprises an array of active regions sections, including the active region section, the active region layer means being disposed at a bottom surface thereof on the bottom mirror, wherein the heat-spreading layer is disposed directly on the top surface of each active region section of the array and on ~~active region layer~~ portions of the active region layer means outside each active region section of the array.

21. (canceled)

22. (previously canceled)

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23. (canceled)